P P SAVANI UNIVERSITY

First Semester of Diploma Examination

January 2022

IDSH1010 Fundamentals of Mathematics

24.01.2022, Monday **Time: 12:30 p.m. To 3:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in same answer sheet.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 Answer all the questions. **[06]**

(i) What will be the value of $\log_2 1$?

(ii) Write the identity matrix of order 3.

(iii) Write the value of $\sin \pi$.

Answer any three of the followings.

Q - 2 Solve $\log(2x + 1) + \log(3x - 1) = 0$. **[08]**

Q - 3 If $A = \begin{pmatrix} 3 & 1 & 2 \\ 2 & -3 & -1 \\ 1 & 2 & 1 \end{pmatrix}$. Find A^{-1}. **[08]**

Q - 4 If $\begin{pmatrix} x & 3 \\ y & 2 \end{pmatrix}\begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 15 \\ 12 \end{pmatrix}$. Find the value of x *and* y. **[08]**

Q - 5 If $sinx + sin^2x = 1$, prove that $cos^8x + 2cos^6x + cos^4x = 1$. **[08]**

SECTION – II

Q - 1 Answer all the questions. **[06]**

(i) What is the distance between the points $(1,2)$ *and* $(-1,-2)$.

(ii) Write the unit vector of $(-3,-4)$.

(iii) What is the area of the square if one side is 2 cm.

Answer any three of the followings.

Q - 2 Prove that the lines $3x + 2y + 1 = 0$ and $6x + 4y + 3 = 0$ are parallel to each other. **[08]**

Q - 3 What will be the value of k such that the points $(k^2, 2k)$, $(-5,-1)$ *and* $(-1,1)$ are collinear? **[08]**

Q - 4 Suppose $\vec{x} = (1,2,3)$ *and* $\vec{y} = (-2,1,-2)$. Evaluate $\vec{x} \times \vec{y}$. **[08]**

Q - 5 Find the circumference of the circle whose area is 38.5 cm^2. **[08]**

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